

## **Abstract**

An architecture and methodology for test data compression using combinational functions to provide serial coupling between consecutive segments of a scan-chain are described. Compressed serial-scan sequences are derived starting from scan state identifying desired Care\_In values and using symbolic computations iteratively in order to determine the necessary previous scan-chain state until computed previous scan-chain state matches given known starting scan-chain state. A novel design for a new flip-flop is also presented that allows implementing scan-chains that can be easily started and stopped without requiring an additional control signal. Extensions of the architecture and methodology are discussed to handle unknown (X) values in scan-chains, proper clocking of compressed data into multiple scan-chains, the use of a data-spreading network and the use of a pseudo-random signal generator to feed the segmented scan-chains in order to implement Built In Self Test (BIST).